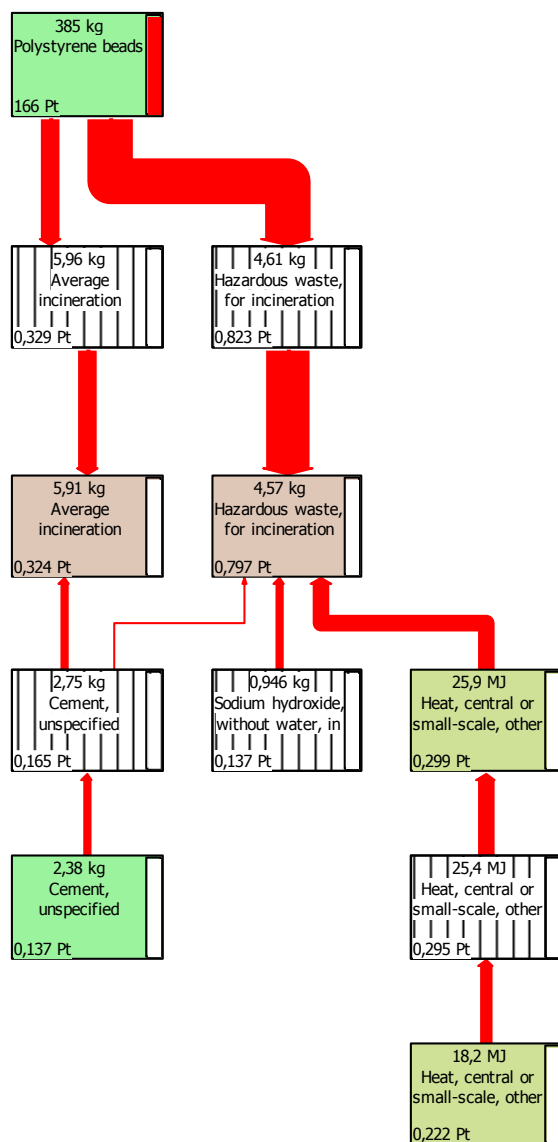
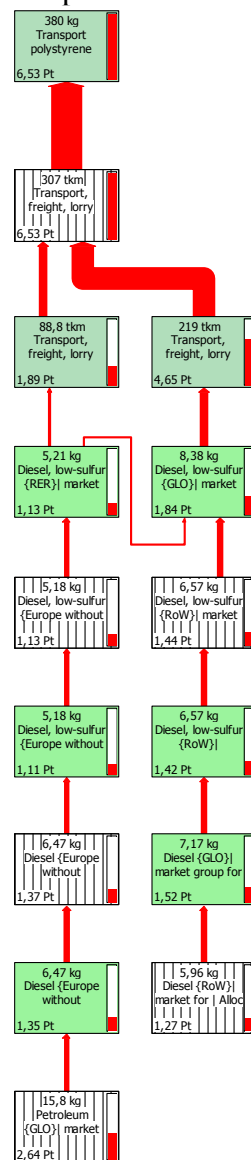


## Lampiran 1. Network

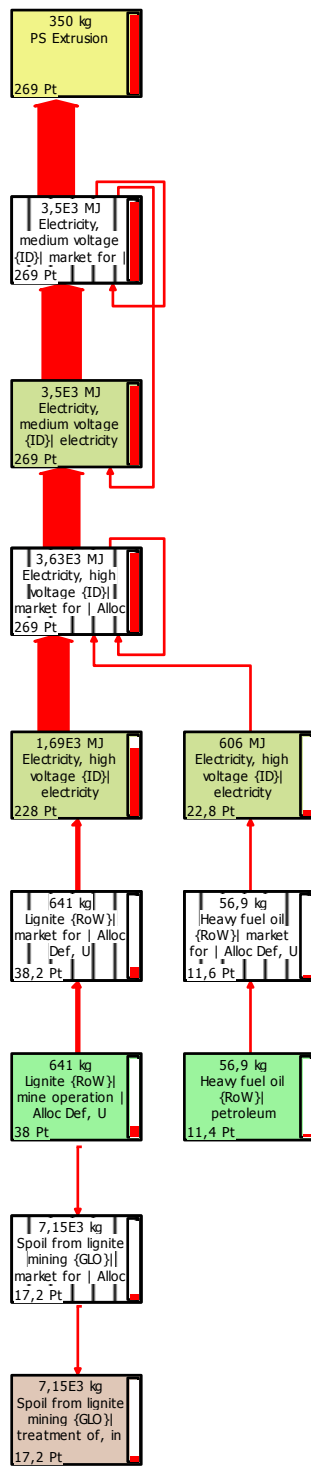
Network Proses Ekstraksi



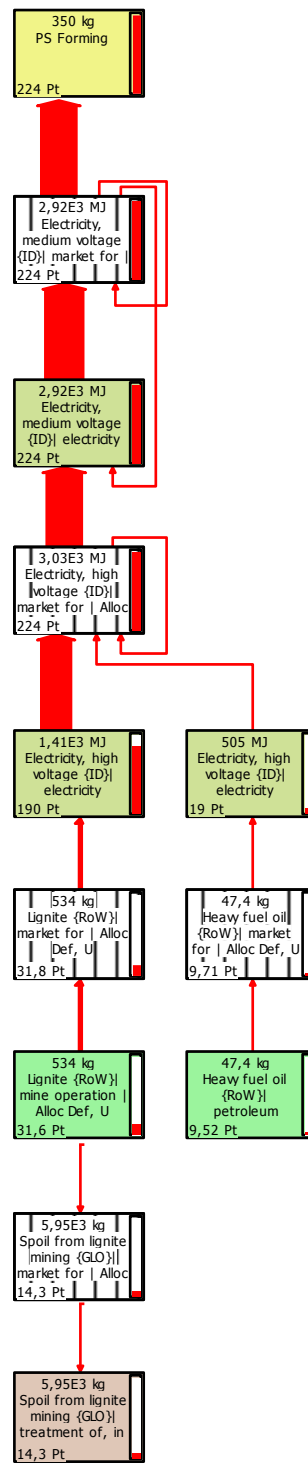
Network Transportasi Bahan Baku



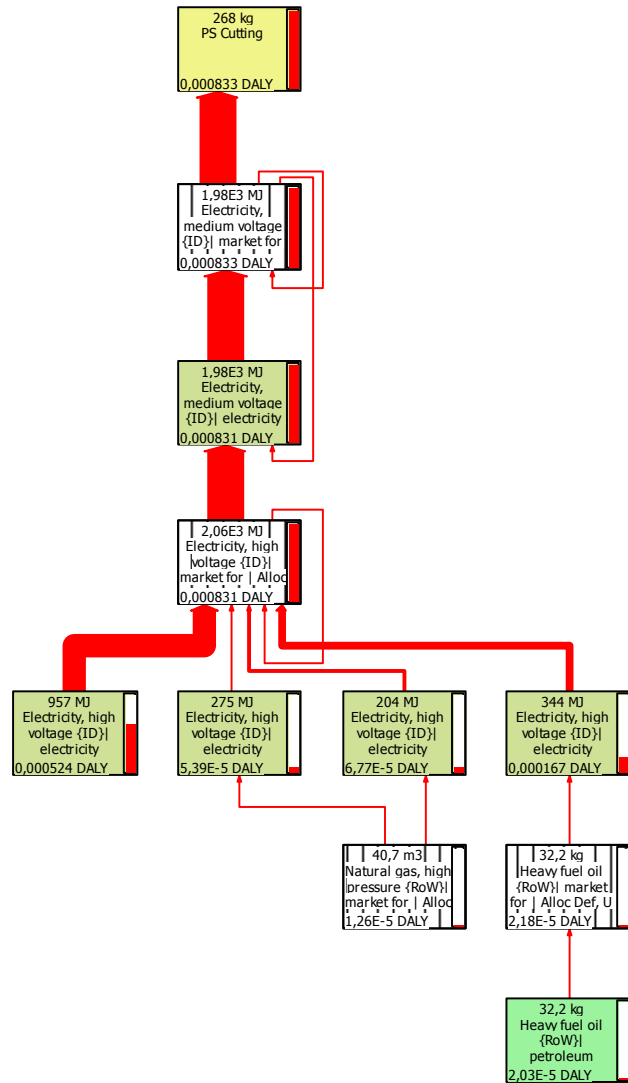
### Network Proses Ekstrusi



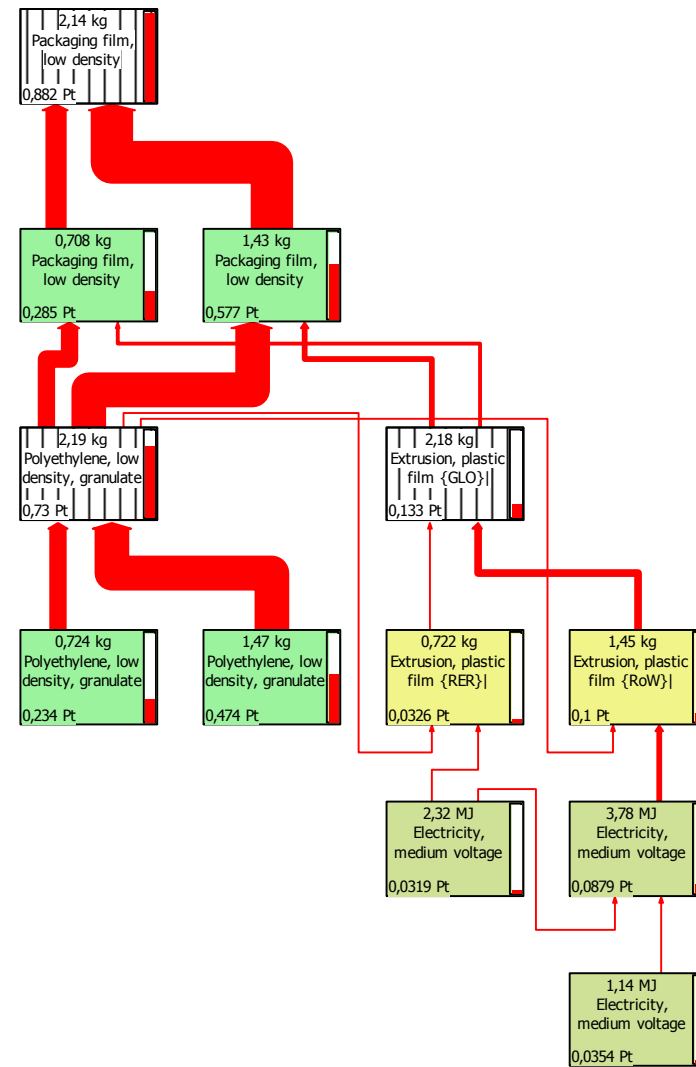
### Network Proses Forming



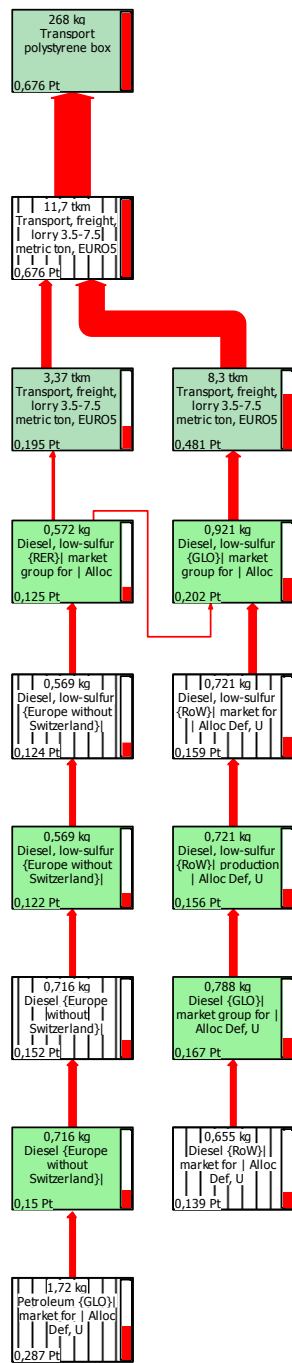
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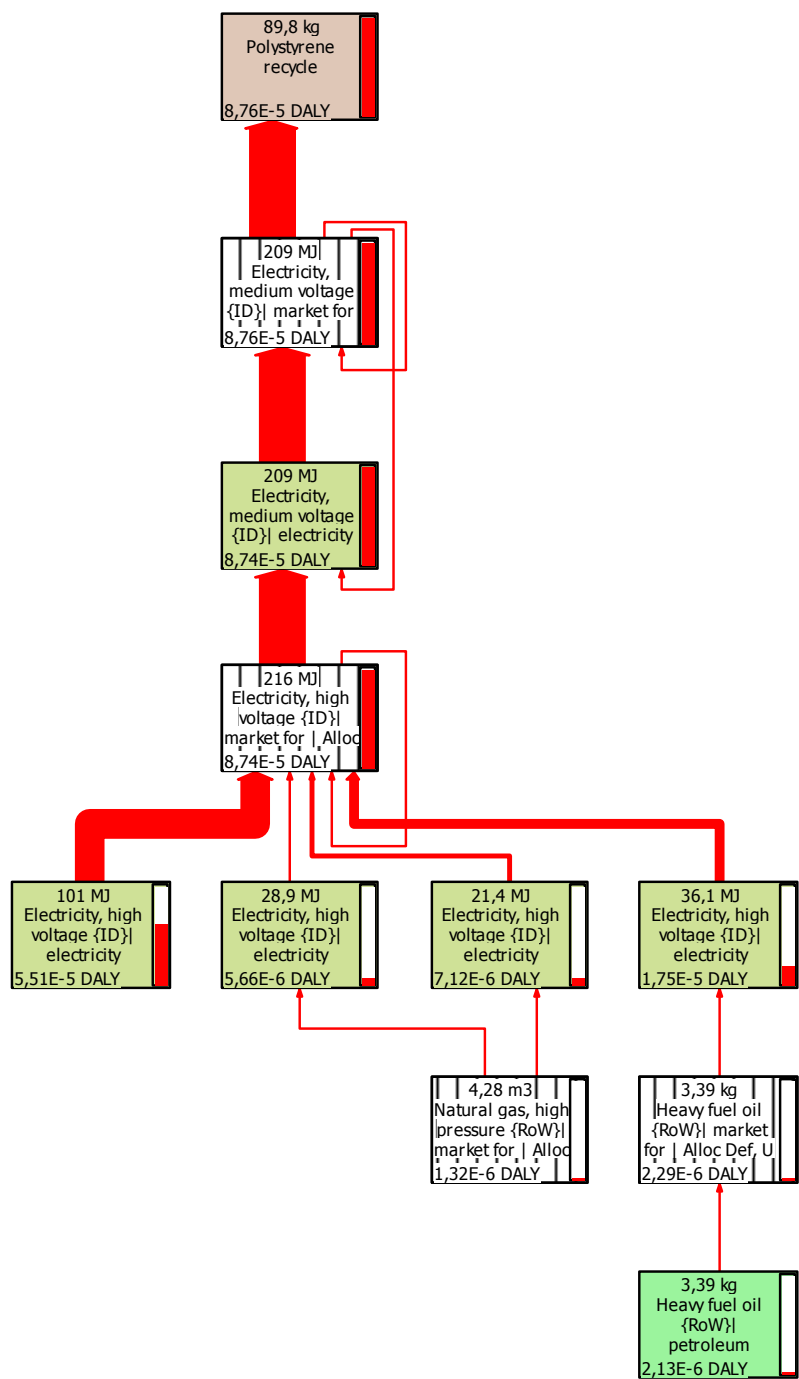
### Network Proses Packaging



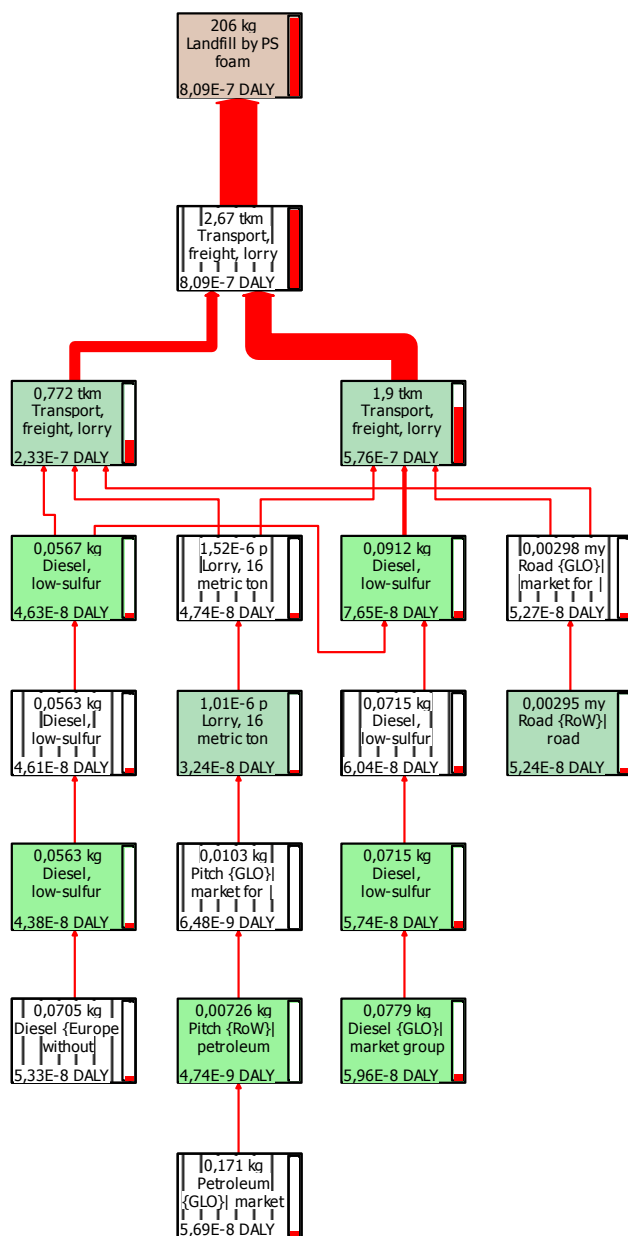
### Network Distribusi Produk



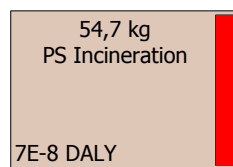
### Network Proses Daur Ulang



### Network Landfill

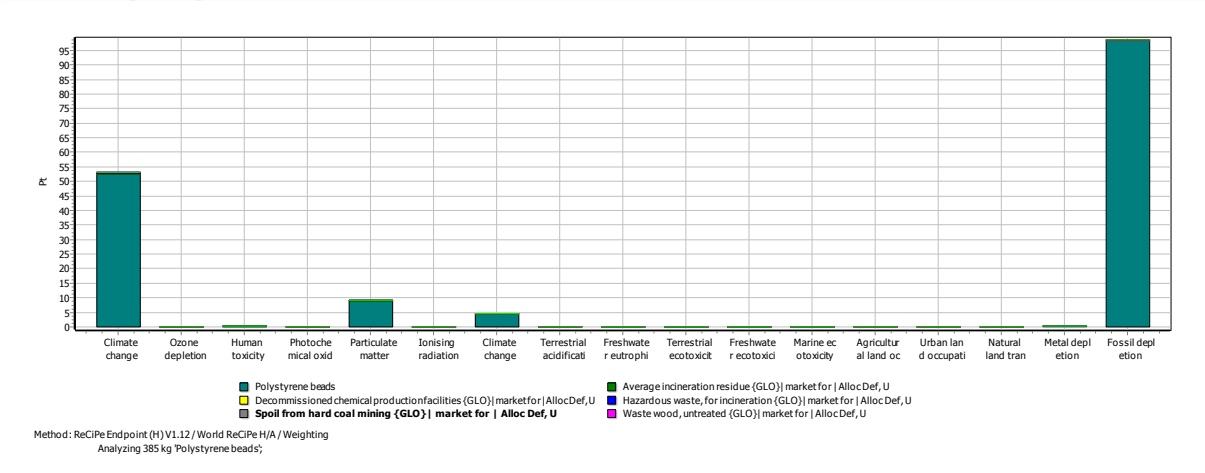


### Network Incineration

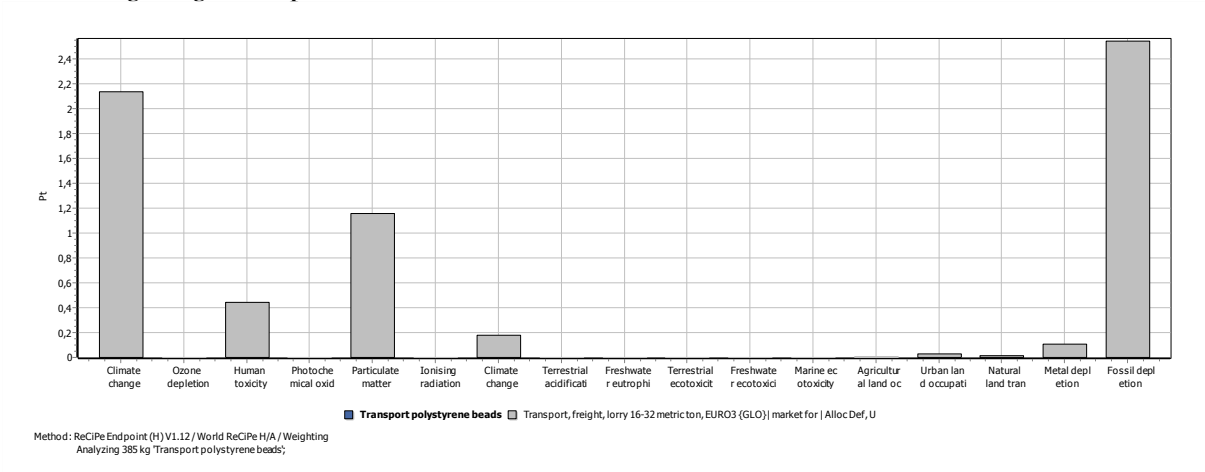


Lampiran 2. Hasil Pembobotan (Weighting) Nilai Dampak

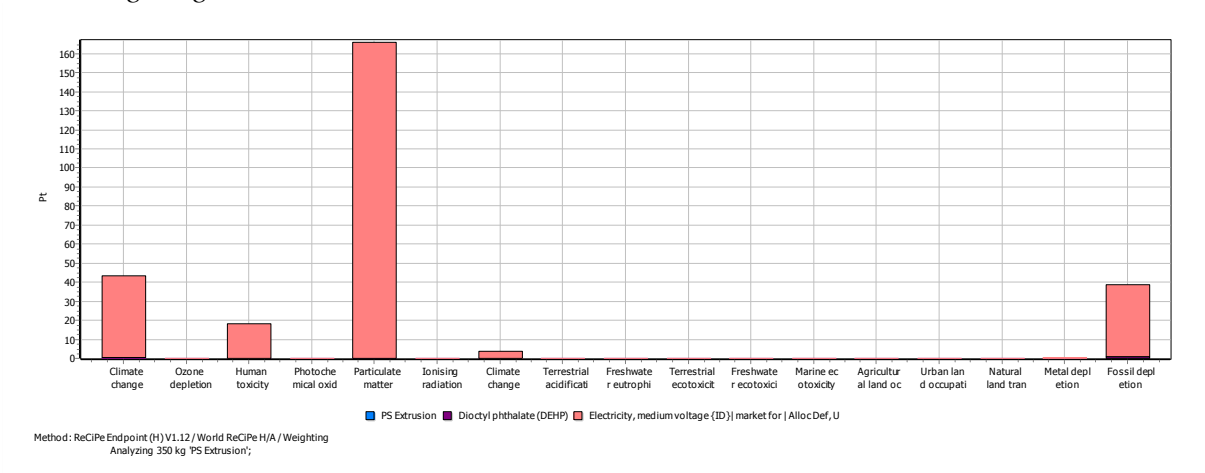
Hasil Weighting Proses Ekstraksi



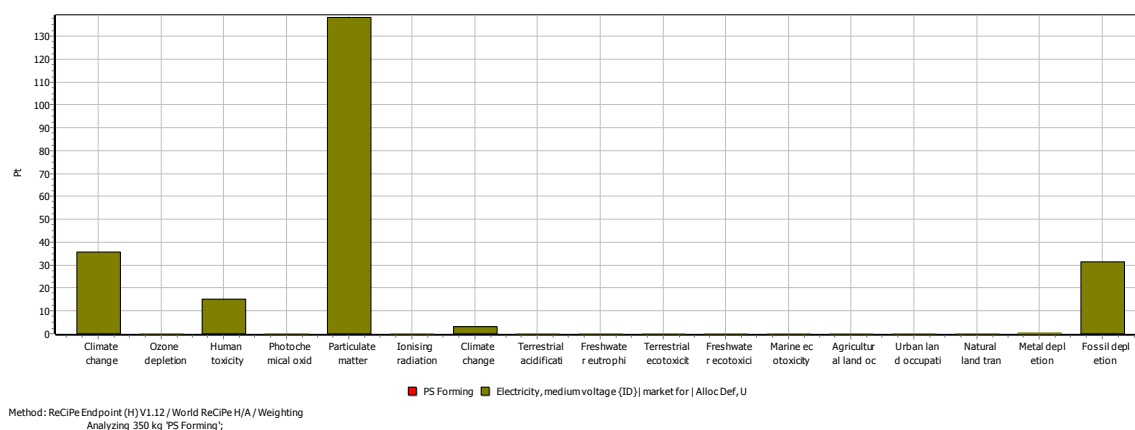
Hasil Weighting Transportasi Bahan Baku



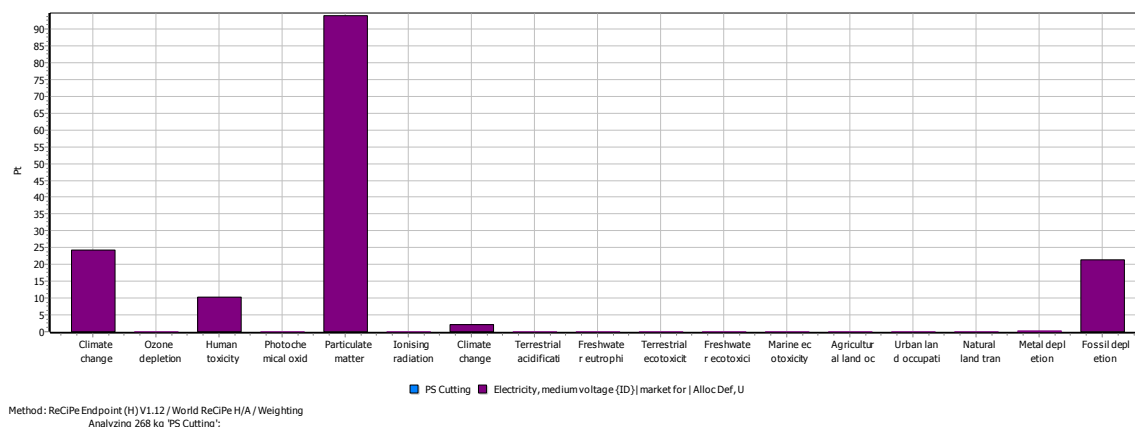
Hasil Weighting Proses Ekstrusi



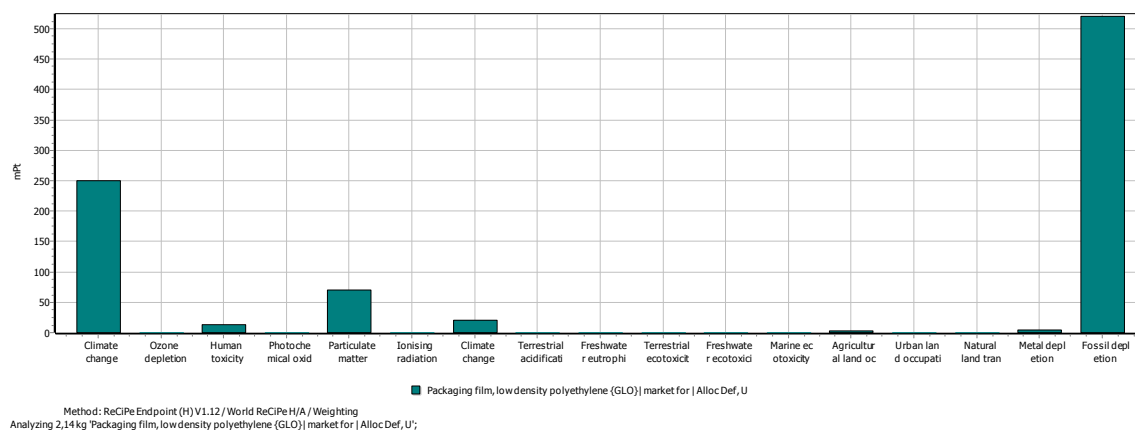
### Hasil Weighting Proses Forming



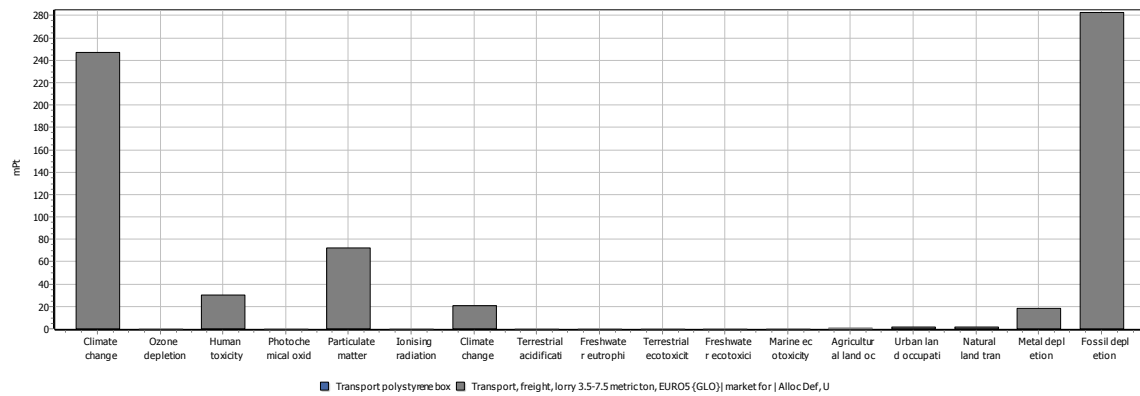
### Hasil Weighting Proses Cutting



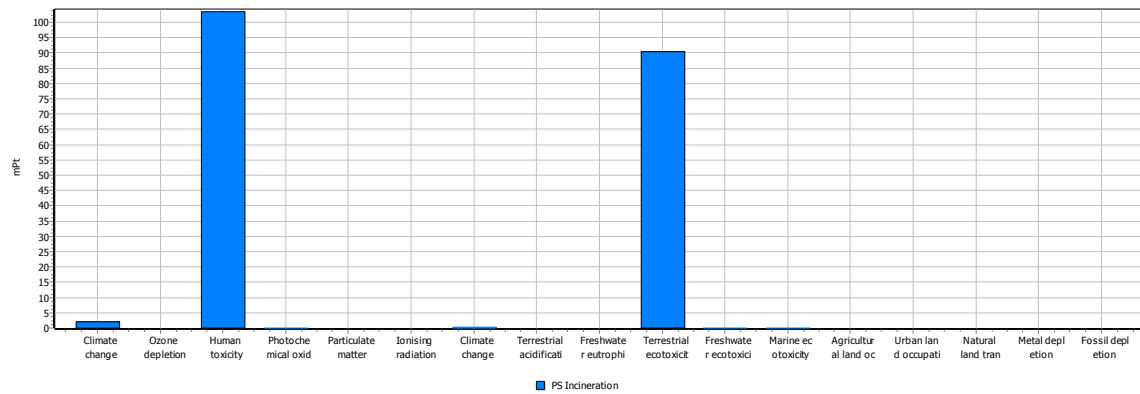
### Hasil Weighting Proses Packaging



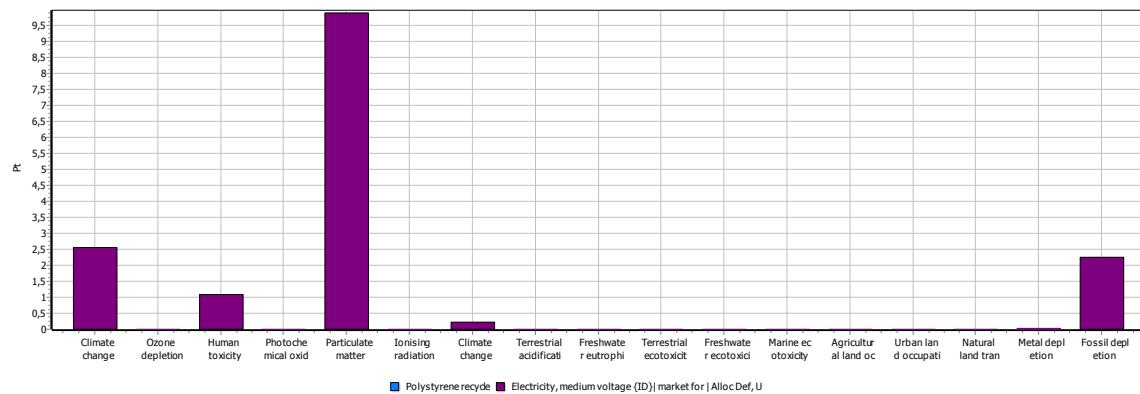
## Hasil Weighting Distribusi Produk



## Hasil Weighting Incineration

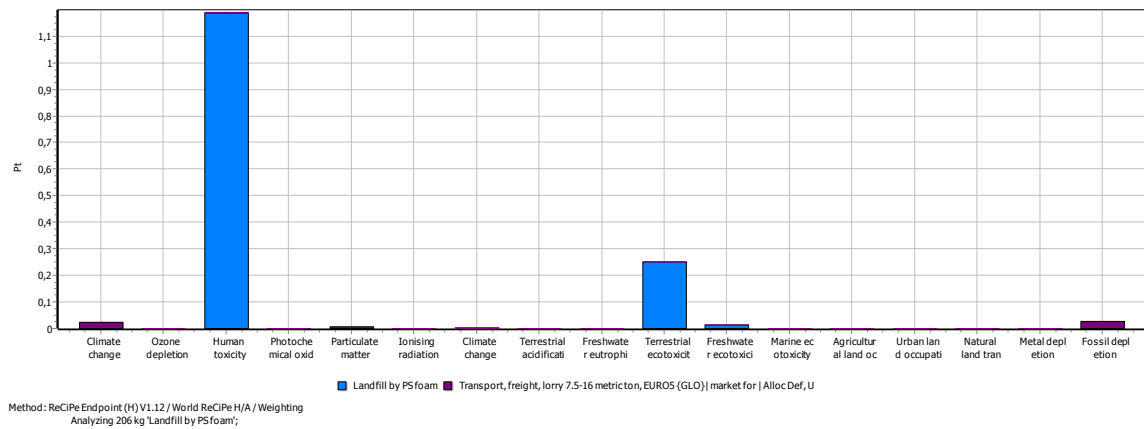


## Hasil Weighting Proses Daur Ulang

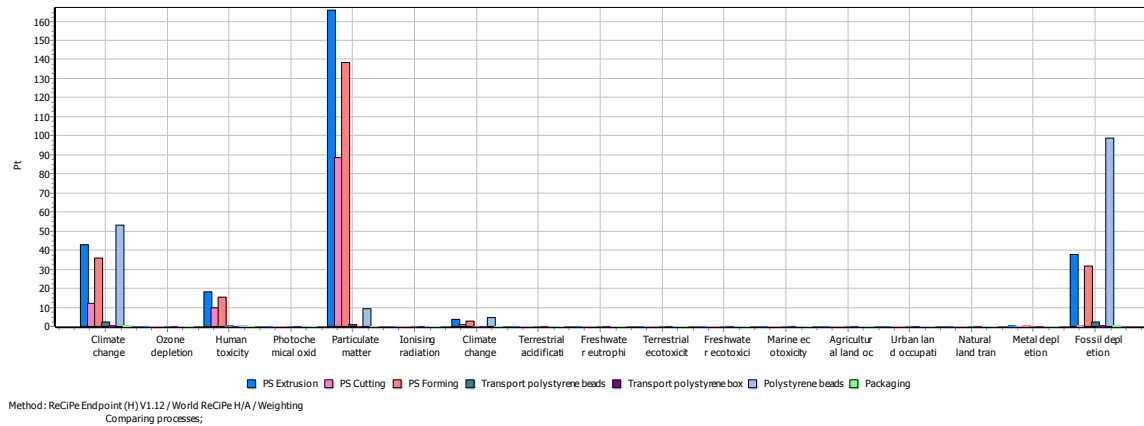




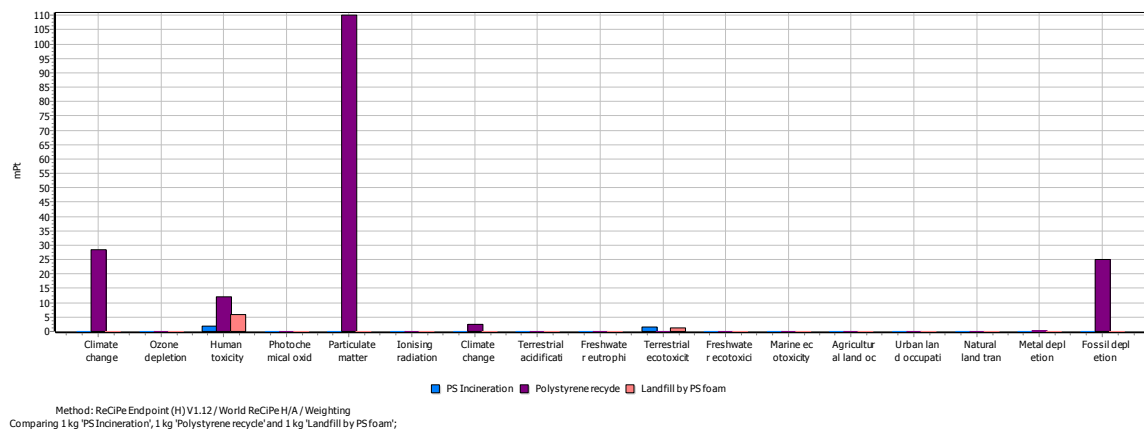
### Hasil Weighting Landfill



### Hasil Weighting Perbandingan Seluruh Proses



### Hasil Weighting Perbandingan Skenario Penanganan Limbah



### Lampiran 3. Hasil Penilaian Dampak

#### Penilaian Dampak Gabungan Proses

Impact category	Unit	Total	Packaging	Extraction	PS Extrusion	PS Forming	PS Cutting	Transport material	Transport product
Climate change Human Health	DALY	0.0047387	8.53E-06	0.001812309	0.00146936	0.000936717	0.00043048	7.29E-05	8.42E-06
Ozone depletion	DALY	3.72E-07	3.39E-10	8.17E-08	1.19E-07	7.59E-08	6.69E-08	2.52E-08	2.76E-09
Human toxicity	DALY	0.001400024	4.35E-07	1.14E-05	0.000623774	0.000397656	0.000351418	1.43E-05	1.04E-06
Photochemical oxidant formation	DALY	4.27E-07	1.01E-09	1.68E-07	1.27E-07	8.10E-08	4.11E-08	8.16E-09	8.31E-10
Particulate matter formation	DALY	0.012739711	2.40E-06	0.000310228	0.005656369	0.003605935	0.003135403	2.69E-05	2.47E-06
Ionising radiation	DALY	6.87E-07	5.89E-09	5.97E-09	2.74E-07	1.75E-07	1.55E-07	6.46E-08	7.28E-09
Climate change Ecosystems	species.yr	2.68E-05	4.83E-08	1.03E-05	8.32E-06	5.31E-06	2.44E-06	4.13E-07	4.77E-08
Terrestrial acidification	species.yr	8.10E-08	1.33E-10	2.19E-08	2.85E-08	1.82E-08	1.12E-08	9.70E-10	1.08E-10
Freshwater eutrophication	species.yr	1.50E-07	3.44E-11	1.93E-09	6.70E-08	4.27E-08	3.78E-08	1.85E-10	2.88E-11
Terrestrial ecotoxicity	species.yr	2.22E-08	3.60E-11	2.32E-09	6.42E-09	4.10E-09	3.31E-09	5.75E-09	2.52E-10
Freshwater ecotoxicity	species.yr	4.70E-08	2.13E-11	9.54E-10	2.08E-08	1.33E-08	1.16E-08	3.34E-10	3.63E-11
Marine ecotoxicity	species.yr	9.15E-09	4.04E-12	1.89E-10	4.03E-09	2.57E-09	2.25E-09	1.06E-10	8.54E-12
Agricultural land occupation	species.yr	1.22E-07	6.13E-09	5.52E-09	4.58E-08	2.92E-08	2.52E-08	8.61E-09	1.09E-09
Urban land occupation	species.yr	1.34E-07	7.13E-10	3.07E-09	3.12E-08	1.99E-08	1.72E-08	5.75E-08	4.23E-09
Natural land transformation	species.yr	5.32E-07	5.27E-10	2.87E-11	2.24E-07	1.43E-07	1.27E-07	3.52E-08	3.83E-09
Metal depletion	\$	1.2668497	0.005213637	0.27765784	0.40571424	0.25864283	0.16746483	0.12944257	0.022713732
Fossil depletion	\$	201.64266	0.63771508	120.82446	46.357825	29.553113	0.83172989	3.0912918	0.34652424

### Penilaian Dampak Proses Ekstraksi (Karakterisasi)

Impact category	Unit	Total	Extraction	Average incineration residue	Decommissioned chemical production facilities	Hazardous waste, for incineration	Spoil from hard coal mining	Waste wood, untreated	Coal slurry	Waste plastic, mixture	Municipal solid waste	Municipal solid waste
Climate change Human Health	DALY	0.001812309	0.001791471	3.10E-06	6.99E-09	1.72E-05	0	7.32E-10	0	5.35E-08	1.74E-08	4.22E-07
Ozone depletion	DALY	8.17E-08	7.87E-08	2.94E-10	3.02E-12	2.63E-09	0	1.11E-13	0	1.57E-12	5.37E-13	2.00E-11
Human toxicity	DALY	1.14E-05	2.49E-06	5.75E-06	2.75E-08	1.25E-06	1.47E-06	4.02E-10	2.80E-07	1.43E-08	7.26E-09	1.50E-07
Photochemical oxidant formation	DALY	1.68E-07	1.67E-07	2.06E-10	7.57E-13	9.06E-10	0	1.77E-13	0	1.15E-12	5.68E-13	1.54E-11
Particulate matter formation	DALY	0.000310228	0.0003069	6.45E-07	2.57E-09	2.60E-06	0	3.67E-10	0	2.68E-09	7.62E-10	3.74E-08
Ionising radiation	DALY	5.97E-09	0	1.21E-09	6.56E-12	4.68E-09	0	4.05E-13	0	4.57E-12	1.40E-12	5.69E-11
Climate change Ecosystems	species.yr	1.03E-05	1.01E-05	1.76E-08	3.96E-11	9.76E-08	0	4.14E-12	0	3.03E-10	9.80E-11	2.39E-09
Terrestrial acidification	species.yr	2.19E-08	2.17E-08	3.01E-11	1.07E-13	1.41E-10	0	1.68E-14	0	1.19E-13	3.63E-14	1.67E-12
Freshwater eutrophication	species.yr	1.93E-09	1.07E-09	4.94E-10	3.97E-14	1.96E-10	1.62E-10	4.45E-15	4.28E-15	2.10E-14	1.49E-14	1.12E-12
Terrestrial ecotoxicity	species.yr	2.32E-09	1.76E-09	4.85E-10	4.33E-13	6.13E-11	8.26E-14	1.70E-14	1.43E-14	6.23E-13	5.17E-14	9.08E-12
Freshwater ecotoxicity	species.yr	9.54E-10	1.68E-11	6.24E-10	3.00E-11	8.87E-11	4.43E-11	1.13E-14	1.15E-11	2.75E-12	3.28E-12	1.32E-10
Marine ecotoxicity	species.yr	1.89E-10	3.52E-11	9.25E-11	5.32E-12	1.74E-11	8.66E-12	2.15E-15	2.19E-12	4.85E-13	5.80E-13	2.63E-11
Agricultural land occupation	species.yr	5.52E-09	0	4.24E-10	5.77E-12	5.08E-09	0	1.18E-13	0	1.31E-12	3.87E-13	1.32E-11
Urban land occupation	species.yr	3.07E-09	0	1.57E-09	3.94E-12	1.43E-09	0	5.63E-13	0	6.99E-12	2.13E-12	5.56E-11
Natural land transformation	species.yr	2.87E-11	0	-9.75E-10	1.10E-12	9.93E-10	0	-2.61E-13	0	-2.45E-12	-1.28E-12	1.37E-11
Metal depletion	\$	0.27765784	0.26597	0.00211810	3.06E-05	0.0092695	0	1.73E-06	0	1.39E-05	2.21E-06	0.0002517
Fossil depletion	\$	120.82446	120.58738	0.04908611	0.00017266	0.1850561	0	1.61E-05	0	0.000199	6.68E-05	0.0024763

## Penilaian Dampak Proses Ekstraksi (Normalisasi)

Impact category	Total	Extraction	Average incineration residue	Decommissioned chemical production facilities	Hazardous waste, for incineration	Spoil from hard coal mining	Waste wood, untreated	Coal slurry	Waste plastic, mixture	Municipal solid waste	Municipal solid waste
Climate change Human Health	0.13284226	0.13131481	0.000227236	5.12E-07	0.001263494	0	5.37E-08	0	3.92E-06	1.27E-06	3.10E-05
Ozone depletion	5.99E-06	5.77E-06	2.15E-08	2.21E-10	1.92E-07	0	8.17E-12	0	1.15E-10	3.94E-11	1.47E-09
Human toxicity	0.000837692	0.000182267	0.000421205	2.02E-06	9.15E-05	0.000107546	2.95E-08	2.05E-05	1.05E-06	5.32E-07	1.10E-05
Photochemical oxidant formation	1.23E-05	1.22E-05	1.51E-08	5.55E-11	6.64E-08	0	1.30E-11	0	8.46E-11	4.16E-11	1.13E-09
Particulate matter formation	0.022739693	0.022498673	4.73E-05	1.88E-07	0.000190551	0	2.69E-08	0	1.96E-07	5.59E-08	2.74E-06
Ionising radiation	4.37E-07	0	8.90E-08	4.81E-10	3.43E-07	0	2.97E-11	0	3.35E-10	1.03E-10	4.17E-09
Climate change Ecosystems	0.011186057	0.011057407	1.91E-05	4.31E-08	0.000106418	0	4.51E-09	0	3.31E-07	1.07E-07	2.61E-06
Terrestrial acidification	2.38E-05	2.36E-05	3.28E-08	1.17E-10	1.54E-07	0	1.83E-11	0	1.30E-10	3.96E-11	1.82E-09
Freshwater eutrophication	2.10E-06	1.17E-06	5.38E-07	4.33E-11	2.13E-07	1.77E-07	4.85E-12	4.67E-12	2.29E-11	1.63E-11	1.22E-09
Terrestrial ecotoxicity	2.53E-06	1.92E-06	5.28E-07	4.72E-10	6.68E-08	9.00E-11	1.85E-11	1.56E-11	6.79E-10	5.64E-11	9.90E-09
Freshwater ecotoxicity	1.04E-06	1.83E-08	6.80E-07	3.27E-08	9.67E-08	4.83E-08	1.23E-11	1.26E-08	3.00E-09	3.57E-09	1.44E-07
Marine ecotoxicity	2.06E-07	3.84E-08	1.01E-07	5.80E-09	1.90E-08	9.44E-09	2.34E-12	2.39E-09	5.28E-10	6.32E-10	2.87E-08
Agricultural land occupation	6.02E-06	0	4.62E-07	6.29E-09	5.53E-06	0	1.29E-10	0	1.43E-09	4.22E-10	1.44E-08
Urban land occupation	3.35E-06	0	1.71E-06	4.30E-09	1.56E-06	0	6.14E-10	0	7.62E-09	2.32E-09	6.07E-08
Natural land transformation	3.13E-08	0	-1.06E-06	1.20E-09	1.08E-06	0	-2.84E-10	0	-2.67E-09	-1.40E-09	1.50E-08
Metal depletion	0.001132844	0.001085158	8.64E-06	1.25E-07	3.78E-05	0	7.06E-09	0	5.69E-08	9.01E-09	1.03E-06
Fossil depletion	0.49296379	0.49199652	0.000200271	7.04E-07	0.000755029	0	6.58E-08	0	8.14E-07	2.73E-07	1.01E-05

### Penilaian Dampak Proses Ekstraksi (Pembobotan)

Impact category	Unit	Total	Extraction	Average incineration residue	Decommissioned chemical production facilities	Hazardous waste, for incineration	Spoil from hard coal mining	Waste wood, untreated	Coal slurry	Waste plastic, mixture	Municipal solid waste	Municipal solid waste
Total	Pt	165.88474	164.65552	0.32896506	0.001291378	0.82309978	0.043112	6.06E-05	0.008212	0.002379297	0.0008455	0.021257153
Climate change Human Health	Pt	53.136903	52.525926	0.090894503	0.000204809	0.50539743	0	2.15E-05	0	0.001569876	0.0005090	0.012380304
Ozone depletion	Pt	0.002394846	0.002308496	8.62E-06	8.85E-08	7.70E-05	0	3.27E-09	0	4.59E-08	1.58E-08	5.86E-07
Human toxicity	Pt	0.33507687	0.072906756	0.16848209	0.000807599	0.03661262	0.043018	1.18E-05	0.008206	0.000419997	0.00021274	0.004398728
Photochemical oxidant formation	Pt	0.004929075	0.00489594	6.04E-06	2.22E-08	2.66E-05	0	5.18E-09	0	3.38E-08	1.67E-08	4.52E-07
Particulate matter formation	Pt	9.0958771	8.9994694	0.01890423	7.52E-05	0.076220591	0	1.07E-05	0	7.85E-05	2.24E-05	0.001096129
Ionising radiation	Pt	0.000174999	0	3.56E-05	1.92E-07	0.000137347	0	1.19E-08	0	1.34E-07	4.11E-08	1.67E-06
Climate change Ecosystems	Pt	4.4744228	4.4229629	0.007655824	1.73E-05	0.042567314	0	1.81E-06	0	0.000132217	4.27E-05	0.001042766
Terrestrial acidification	Pt	0.009527493	0.009451838	1.31E-05	4.67E-08	6.17E-05	0	7.32E-09	0	5.19E-08	1.58E-08	7.29E-07
Freshwater eutrophication	Pt	0.000840554	0.000468649	0.0002153	1.73E-08	8.53E-05	7.08E-05	1.94E-09	1.87E-09	9.17E-09	6.50E-09	4.89E-07
Terrestrial ecotoxicity	Pt	0.001010118	0.00076756	0.000211357	1.89E-07	2.67E-05	3.60E-08	7.39E-09	6.23E-09	2.71E-07	2.26E-08	3.96E-06
Freshwater ecotoxicity	Pt	0.000415956	7.33E-06	0.000272165	1.31E-05	3.87E-05	1.93E-05	4.91E-09	5.02E-06	1.20E-06	1.43E-06	5.78E-05
Marine ecotoxicity	Pt	8.23E-05	1.54E-05	4.03E-05	2.32E-06	7.60E-06	3.78E-06	9.37E-10	9.55E-07	2.11E-07	2.53E-07	1.15E-05
Agricultural land occupation	Pt	0.002407092	0	0.00018484	2.52E-06	0.002213182	0	5.14E-08	0	5.73E-07	1.69E-07	5.76E-06
Urban land occupation	Pt	0.001338861	0	0.000683645	1.72E-06	0.000625014	0	2.46E-07	0	3.05E-06	9.27E-07	2.43E-05
Natural land transformation	Pt	1.25E-05	0	-0.00042526	4.80E-07	0.00043304	0	-1.14E-07	0	-1.07E-06	-5.59E-07	5.98E-06
Metal depletion	Pt	0.2265688	0.21703152	0.001728371	2.49E-05	0.007563933	0	1.41E-06	0	1.14E-05	1.80E-06	0.000205429
Fossil depletion	Pt	98.592757	98.399305	0.040054267	0.000140892	0.15100583	0	1.32E-05	0	0.000162828	5.45E-05	0.002020686

## Penilaian Dampak Transportasi Bahan Baku

Impact category	Characterization			Normalization		Weighting (Pt)	
	Unit	Total	Transport, freight, lorry 16-32 metric ton	Total	Transport, freight, lorry 16-32 metric ton	Total	Transport, freight, lorry 16-32 metric ton
Climate change Human Health	DALY	7.28E-05	7.28E-05	0.005336162	0.005336162	6.6146503	6.6146503
Ozone depletion	DALY	2.54E-08	2.54E-08	1.86E-06	1.86E-06	2.1344649	2.1344649
Human toxicity	DALY	1.52E-05	1.52E-05	0.001115291	0.001115291	0.00074456	0.00074456
Photochemical oxidant formation	DALY	1.60E-08	1.60E-08	1.18E-06	1.18E-06	0.44611649	0.44611649
Particulate matter formation	DALY	3.94E-05	3.94E-05	0.002885803	0.002885803	0.000470527	0.000470527
Ionising radiation	DALY	6.50E-08	6.50E-08	4.77E-06	4.77E-06	1.154321	1.154321
Climate change Ecosystems	species.yr	4.12E-07	4.12E-07	0.000449452	0.000449452	0.001907192	0.001907192
Terrestrial acidification	species.yr	1.59E-09	1.59E-09	1.74E-06	1.74E-06	0.17978084	0.17978084
Freshwater eutrophication	species.yr	1.86E-10	1.86E-10	2.03E-07	2.03E-07	0.000695037	0.000695037
Terrestrial ecotoxicity	species.yr	5.80E-09	5.80E-09	6.32E-06	6.32E-06	8.11E-05	8.11E-05
Freshwater ecotoxicity	species.yr	3.34E-10	3.34E-10	3.65E-07	3.65E-07	0.002527079	0.002527079
Marine ecotoxicity	species.yr	1.06E-10	1.06E-10	1.16E-07	1.16E-07	0.000145814	0.000145814
Agricultural land occupation	species.yr	8.62E-09	8.62E-09	9.40E-06	9.40E-06	4.63E-05	4.63E-05
Urban land occupation	species.yr	5.76E-08	5.76E-08	6.27E-05	6.27E-05	0.003759639	0.003759639
Natural land transformation	species.yr	3.55E-08	3.55E-08	3.86E-05	3.86E-05	0.025099343	0.025099343
Metal depletion	\$	0.12960854	0.12960854	0.000528803	0.000528803	0.01545692	0.01545692
Fossil depletion	\$	3.116756	3.116756	0.012716364	0.012716364	0.10576057	0.10576057

# Penilaian Dampak Proses Ekstrusi

Impact category	Characterization				Normalization			Weighting (Pt)		
	Unit	Total	Dioctyl phthalate (DEHP)	Electricity, medium voltage {ID}	Total	Dioctyl phthalate (DEHP)	Electricity, medium voltage {ID}	Total	Dioctyl phthalate (DEHP)	Electricity, medium voltage {ID}
Climate change Human Health	DALY	0.00148073	1.14E-05	0.00146936	0.10853753	0.00083343	0.10770409	270.51336	1.3086469	269.20471
Ozone depletion	DALY	1.21E-07	1.67E-09	1.19E-07	8.85E-06	1.23E-07	8.73E-06	43.415013	0.33337554	43.081637
Human toxicity	DALY	0.00062485	1.08E-06	0.00062377	0.04580147	7.88E-05	0.04572266	0.00353970	4.90E-05	0.00349068
Photochemical oxidant formation	DALY	1.28E-07	1.29E-09	1.27E-07	9.41E-06	9.45E-08	9.31E-06	18.320588	0.03152140	18.289067
Particulate matter formation	DALY	0.00566050	4.13E-06	0.005656369	0.41491491	0.00030305	0.41461185	0.00376216	3.78E-05	0.00372435
Ionising radiation	DALY	2.84E-07	9.32E-09	2.74E-07	2.08E-05	6.83E-07	2.01E-05	165.96596	0.12122198	165.84474
Climate change Ecosystems	species.yr	8.39E-06	6.44E-08	8.32E-06	0.00914182	7.02E-05	0.00907163	0.00831226	0.00027337	0.00803888
Terrestrial acidification	species.yr	2.87E-08	1.99E-10	2.85E-08	3.13E-05	2.17E-07	3.11E-05	3.6567298	0.02807504	3.6286547
Freshwater eutrophication	species.yr	6.70E-08	8.03E-11	6.70E-08	7.31E-05	8.75E-08	7.30E-05	0.01251409	8.67E-05	0.01242739
Terrestrial ecotoxicity	species.yr	6.48E-09	5.08E-11	6.42E-09	7.06E-06	5.54E-08	7.00E-06	0.02922877	3.50E-05	0.02919377
Freshwater ecotoxicity	species.yr	2.09E-08	5.05E-11	2.08E-08	2.27E-05	5.50E-08	2.27E-05	0.00282321	2.22E-05	0.00280106
Marine ecotoxicity	species.yr	4.04E-09	9.69E-12	4.03E-09	4.40E-06	1.06E-08	4.39E-06	0.00909216	2.20E-05	0.00907016
Agricultural land occupation	species.yr	4.85E-08	2.65E-09	4.58E-08	5.28E-05	2.89E-06	4.99E-05	0.00176060	4.22E-06	0.00175637
Urban land occupation	species.yr	3.19E-08	6.66E-10	3.12E-08	3.47E-05	7.26E-07	3.40E-05	0.02113082	0.00115574	0.01997508
Natural land transformation	species.yr	2.26E-07	2.28E-09	2.24E-07	0.00024618	2.48E-06	0.00024370	0.01389770	0.00029027	0.01360743
Metal depletion	\$	0.41829319	0.012578946	0.40571424	0.001706636	5.13E-05	0.001655314	0.098473254	0.000991931	0.09748132
Fossil depletion	\$	47.315202	0.95737783	46.357824	0.19304603	0.003906102	0.18913992	0.34132724	0.01026442	0.33106282

Penilaian Dampak Proses *Forming*

Impact category	Characterization			Normalization		Weighting (Pt)	
	Unit	Total	Electricity, medium voltage {ID}	Total	Electricity, medium voltage {ID}	Total	Electricity, medium voltage {ID}
Climate change Human Health	DALY	0.001224467	0.001224467	0.089753412	0.089753412	224.33726	224.33726
Ozone depletion	DALY	9.92E-08	9.92E-08	7.27E-06	7.27E-06	35.901365	35.901365
Human toxicity	DALY	0.000519812	0.000519812	0.038102223	0.038102223	0.002908905	0.002908905
Photochemical oxidant formation	DALY	1.06E-07	1.06E-07	7.76E-06	7.76E-06	15.240889	15.240889
Particulate matter formation	DALY	0.004713641	0.004713641	0.34550988	0.34550988	0.00310363	0.00310363
Ionising radiation	DALY	2.28E-07	2.28E-07	1.67E-05	1.67E-05	138.20395	138.20395
Climate change Ecosystems	species.yr	6.94E-06	6.94E-06	0.007559697	0.007559697	0.006699074	0.006699074
Terrestrial acidification	species.yr	2.38E-08	2.38E-08	2.59E-05	2.59E-05	3.023879	3.023879
Freshwater eutrophication	species.yr	5.58E-08	5.58E-08	6.08E-05	6.08E-05	0.010356166	0.010356166
Terrestrial ecotoxicity	species.yr	5.35E-09	5.35E-09	5.84E-06	5.84E-06	0.024328145	0.024328145
Freshwater ecotoxicity	species.yr	1.73E-08	1.73E-08	1.89E-05	1.89E-05	0.002334222	0.002334222
Marine ecotoxicity	species.yr	3.36E-09	3.36E-09	3.66E-06	3.66E-06	0.007558474	0.007558474
Agricultural land occupation	species.yr	3.82E-08	3.82E-08	4.16E-05	4.16E-05	0.001463648	0.001463648
Urban land occupation	species.yr	2.60E-08	2.60E-08	2.83E-05	2.83E-05	0.016645905	0.016645905
Natural land transformation	species.yr	1.86E-07	1.86E-07	0.000203086	0.000203086	0.011339527	0.011339527
Metal depletion	\$	0.3380952	0.3380952	0.001379428	0.001379428	0.081234437	0.081234437
Fossil depletion	\$	38.631521	38.631521	0.1576166	0.1576166	0.27588569	0.27588569



Penilaian Dampak Proses *Cutting*

Impact category	Characterization			Normalization		Weighting (Pt)	
	Unit	Total	Electricity, medium voltage {ID}	Total	Electricity, medium voltage {ID}	Total	Electricity, medium voltage {ID}
Climate change Human Health	DALY	0.000832637	0.000832637	0.06103232	0.06103232	152.54934	152.54934
Ozone depletion	DALY	6.75E-08	6.75E-08	4.95E-06	4.95E-06	24.412928	24.412928
Human toxicity	DALY	0.000353472	0.000353472	0.025909512	0.025909512	0.001978055	0.001978055
Photochemical oxidant formation	DALY	7.20E-08	7.20E-08	5.28E-06	5.28E-06	10.363805	10.363805
Particulate matter formation	DALY	0.003205276	0.003205276	0.23494672	0.23494672	0.002110468	0.002110468
Ionising radiation	DALY	1.55E-07	1.55E-07	1.14E-05	1.14E-05	93.978687	93.978687
Climate change Ecosystems	species.yr	4.72E-06	4.72E-06	0.005140594	0.005140594	0.00455537	0.00455537
Terrestrial acidification	species.yr	1.62E-08	1.62E-08	1.76E-05	1.76E-05	2.0562377	2.0562377
Freshwater eutrophication	species.yr	3.79E-08	3.79E-08	4.14E-05	4.14E-05	0.007042193	0.007042193
Terrestrial ecotoxicity	species.yr	3.64E-09	3.64E-09	3.97E-06	3.97E-06	0.016543139	0.016543139
Freshwater ecotoxicity	species.yr	1.18E-08	1.18E-08	1.28E-05	1.28E-05	0.001587271	0.001587271
Marine ecotoxicity	species.yr	2.28E-09	2.28E-09	2.49E-06	2.49E-06	0.005139762	0.005139762
Agricultural land occupation	species.yr	2.60E-08	2.60E-08	2.83E-05	2.83E-05	0.000995281	0.000995281
Urban land occupation	species.yr	1.77E-08	1.77E-08	1.93E-05	1.93E-05	0.011319215	0.011319215
Natural land transformation	species.yr	1.27E-07	1.27E-07	0.000138099	0.000138099	0.007710879	0.007710879
Metal depletion	\$	0.22990474	0.22990474	0.000938011	0.000938011	0.055239417	0.055239417
Fossil depletion	\$	26.269434	26.269434	0.10717929	0.10717929	0.18760227	0.18760227

Penilaian Dampak Proses *Packaging*

Impact category	Characterization		Normalization	Weighting (mPt)
	Unit	Packaging film, low density polyethylene {GLO}	Packaging film, low density polyethylene {GLO}	Packaging film, low density polyethylene {GLO}
				882.28604
Climate change Human Health	DALY	8.53E-06	0.000625114	250.04559
Ozone depletion	DALY	3.39E-10	2.49E-08	0.00995039
Human toxicity	DALY	4.35E-07	3.19E-05	12.765171
Photochemical oxidant formation	DALY	1.01E-09	7.41E-08	0.029620345
Particulate matter formation	DALY	2.40E-06	0.000175657	70.262791
Ionising radiation	DALY	5.89E-09	4.31E-07	0.17257004
Climate change Ecosystems	species.yr	4.83E-08	5.26E-05	21.056967
Terrestrial acidification	species.yr	1.33E-10	1.45E-07	0.058040616
Freshwater eutrophication	species.yr	3.44E-11	3.75E-08	0.014988605
Terrestrial ecotoxicity	species.yr	3.60E-11	3.93E-08	0.015712571
Freshwater ecotoxicity	species.yr	2.13E-11	2.32E-08	0.009266529
Marine ecotoxicity	species.yr	4.04E-12	4.40E-09	0.001760456
Agricultural land occupation	species.yr	6.13E-09	6.68E-06	2.6734157
Urban land occupation	species.yr	7.13E-10	7.77E-07	0.31079048
Natural land transformation	species.yr	5.27E-10	5.74E-07	0.22956789
Metal depletion	\$	0.005213637	2.13E-05	4.2543276
Fossil depletion	\$	0.63771508	0.002601878	520.37551

### Penilaian Dampak Proses Distribusi Produk

Impact category	Characterization			Normalization		Weighting (mPt)	
	Unit	Total	Transport, freight, lorry 3.5-7.5 metric ton	Total	Transport, freight, lorry 3.5-7.5 metric ton	Total	Transport, freight, lorry 3.5-7.5 metric ton
Climate change Human Health	DALY	8.42E-06	8.42E-06	0.000617383	0.000617383	676.4435	676.4435
Ozone depletion	DALY	2.76E-09	2.76E-09	2.02E-07	2.02E-07	246.95304	246.95304
Human toxicity	DALY	1.04E-06	1.04E-06	7.60E-05	7.60E-05	0.080797337	0.080797337
Photochemical oxidant formation	DALY	8.31E-10	8.31E-10	6.09E-08	6.09E-08	30.401119	30.401119
Particulate matter formation	DALY	2.47E-06	2.47E-06	0.000181237	0.000181237	0.024357298	0.024357298
Ionising radiation	DALY	7.28E-09	7.28E-09	5.34E-07	5.34E-07	72.494684	72.494684
Climate change Ecosystems	species.yr	4.77E-08	4.77E-08	5.20E-05	5.20E-05	0.21355807	0.21355807
Terrestrial acidification	species.yr	1.08E-10	1.08E-10	1.18E-07	1.18E-07	20.800038	20.800038
Freshwater eutrophication	species.yr	2.88E-11	2.88E-11	3.14E-08	3.14E-08	0.047235181	0.047235181
Terrestrial ecotoxicity	species.yr	2.52E-10	2.52E-10	2.74E-07	2.74E-07	0.012554678	0.012554678
Freshwater ecotoxicity	species.yr	3.63E-11	3.63E-11	3.96E-08	3.96E-08	0.1096702	0.1096702
Marine ecotoxicity	species.yr	8.54E-12	8.54E-12	9.31E-09	9.31E-09	0.01584266	0.01584266
Agricultural land occupation	species.yr	1.09E-09	1.09E-09	1.19E-06	1.19E-06	0.003724349	0.003724349
Urban land occupation	species.yr	4.23E-09	4.23E-09	4.61E-06	4.61E-06	0.47488273	0.47488273
Natural land transformation	species.yr	3.83E-09	3.83E-09	4.17E-06	4.17E-06	1.8447296	1.8447296
Metal depletion	\$	0.022713732	0.022713732	9.27E-05	9.27E-05	1.6690829	1.6690829
Fossil depletion	\$	0.34652423	0.34652423	0.001413819	0.001413819	18.534405	18.534405

Penilaian Dampak *Incineration*

Impact category	Characterization			Normalization		Weighting (mPt)	
	Unit	Total	PS Incineration	Total	PS Incineration	Total	PS Incineration
Climate change Human Health	DALY	7.00E-08	7.00E-08	5.13E-06	5.13E-06	196.11044	196.11044
Ozone depletion	DALY	0	0	0	0	2.0524	2.0524
Human toxicity	DALY	3.53E-06	3.53E-06	0.000258745	0.000258745	0	0
Photochemical oxidant formation	DALY	2.14E-09	2.14E-09	1.57E-07	1.57E-07	103.498	103.498
Particulate matter formation	DALY	0	0	0	0	0.06262752	0.06262752
Ionising radiation	DALY	0	0	0	0	0	0
Climate change Ecosystems	species.yr	3.97E-10	3.97E-10	4.32E-07	4.32E-07	0	0
Terrestrial acidification	species.yr	0	0	0	0	0.172874	0.172874
Freshwater eutrophication	species.yr	0	0	0	0	0	0
Terrestrial ecotoxicity	species.yr	2.07E-07	2.07E-07	0.000225788	0.000225788	0	0
Freshwater ecotoxicity	species.yr	1.94E-11	1.94E-11	2.12E-08	2.12E-08	90.315242	90.315242
Marine ecotoxicity	species.yr	1.88E-12	1.88E-12	2.05E-09	2.05E-09	0.008475934	0.008475934
Agricultural land occupation	species.yr	0	0	0	0	0.000818787	0.000818787
Urban land occupation	species.yr	0	0	0	0	0	0
Natural land transformation	species.yr	0	0	0	0	0	0
Metal depletion	\$	0	0	0	0	0	0
Fossil depletion	\$	0	0	0	0	0	0

### Penilaian Dampak Proses Daur Ulang

Impact category	Characterization			Normalization		Weighting (Pt)	
	Unit	Total	Electricity, medium voltage {ID}	Total	Electricity, medium voltage {ID}	Total	Electricity, medium voltage {ID}
Climate change Human Health	DALY	8.76E-05	8.76E-05	0.006418084	0.006418084	16.041901	16.041901
Ozone depletion	DALY	7.09E-09	7.09E-09	5.20E-07	5.20E-07	2.5672335	2.5672335
Human toxicity	DALY	3.72E-05	3.72E-05	0.002724612	0.002724612	0.00020801	0.00020801
Photochemical oxidant formation	DALY	7.57E-09	7.57E-09	5.55E-07	5.55E-07	1.0898449	1.0898449
Particulate matter formation	DALY	0.000337063	0.000337063	0.024706708	0.024706708	0.000221934	0.000221934
Ionising radiation	DALY	1.63E-08	1.63E-08	1.20E-06	1.20E-06	9.8826831	9.8826831
Climate change Ecosystems	species.yr	4.96E-07	4.96E-07	0.000540579	0.000540579	0.000479037	0.000479037
Terrestrial acidification	species.yr	1.70E-09	1.70E-09	1.85E-06	1.85E-06	0.21623143	0.21623143
Freshwater eutrophication	species.yr	3.99E-09	3.99E-09	4.35E-06	4.35E-06	0.000740548	0.000740548
Terrestrial ecotoxicity	species.yr	3.83E-10	3.83E-10	4.17E-07	4.17E-07	0.001739656	0.001739656
Freshwater ecotoxicity	species.yr	1.24E-09	1.24E-09	1.35E-06	1.35E-06	0.000166915	0.000166915
Marine ecotoxicity	species.yr	2.40E-10	2.40E-10	2.62E-07	2.62E-07	0.000540491	0.000540491
Agricultural land occupation	species.yr	2.73E-09	2.73E-09	2.98E-06	2.98E-06	0.000104662	0.000104662
Urban land occupation	species.yr	1.86E-09	1.86E-09	2.03E-06	2.03E-06	0.001190315	0.001190315
Natural land transformation	species.yr	1.33E-08	1.33E-08	1.45E-05	1.45E-05	0.000810867	0.000810867
Metal depletion	\$	0.024176499	0.024176499	9.86E-05	9.86E-05	0.005808909	0.005808909
Fossil depletion	\$	2.7624614	2.7624614	0.011270842	0.011270842	0.019728023	0.019728023

Penilaian Dampak *Landfill*

Impact category	Characterization				Normalization			Weighting (Pt)		
	Unit	Total	Landfill by PS foam	Transport, freight, lorry 7.5-16 metric ton	Total	Landfill by PS foam	Transport, freight, lorry 7.5-16 metric ton	Total	Landfill by PS foam	Transport, freight, lorry 7.5-16 metric ton
Climate change Human Health	DALY	8.09E-07	0	8.09E-07	5.93E-05	0	5.93E-05	1.5158387	1.4515388	0.064299964
Ozone depletion	DALY	2.72E-10	0	2.72E-10	1.99E-08	0	1.99E-08	0.023719276	0	0.023719276
Human toxicity	DALY	4.06E-05	4.05E-05	7.95E-08	0.002973554	0.002967729	5.82E-06	7.97E-06	0	7.97E-06
Photochemical oxidant formation	DALY	8.57E-11	0	8.57E-11	6.28E-09	0	6.28E-09	1.1894216	1.1870917	0.002329854
Particulate matter formation	DALY	2.34E-07	0	2.34E-07	1.72E-05	0	1.72E-05	2.51E-06	0	2.51E-06
Ionising radiation	DALY	7.05E-10	0	7.05E-10	5.17E-08	0	5.17E-08	0.00687072	0	0.00687072
Climate change Ecosystems	species.yr	4.58E-09	0	4.58E-09	4.99E-06	0	4.99E-06	2.07E-05	0	2.07E-05
Terrestrial acidification	species.yr	1.06E-11	0	1.06E-11	1.15E-08	0	1.15E-08	0.001997797	0	0.001997797
Freshwater eutrophication	species.yr	2.32E-12	0	2.32E-12	2.53E-09	0	2.53E-09	4.60E-06	0	4.60E-06
Terrestrial ecotoxicity	species.yr	5.75E-07	5.75E-07	1.88E-11	0.000626255	0.000626235	2.04E-08	1.01E-06	0	1.01E-06
Freshwater ecotoxicity	species.yr	3.19E-08	3.19E-08	3.46E-12	3.48E-05	3.48E-05	3.77E-09	0.25050211	0.25049393	8.18E-06
Marine ecotoxicity	species.yr	1.11E-10	1.10E-10	7.66E-13	1.21E-07	1.20E-07	8.35E-10	0.013906456	0.013904947	1.51E-06
Agricultural land occupation	species.yr	9.74E-11	0	9.74E-11	1.06E-07	0	1.06E-07	4.85E-05	4.82E-05	3.34E-07
Urban land occupation	species.yr	5.23E-10	0	5.23E-10	5.70E-07	0	5.70E-07	4.25E-05	0	4.25E-05
Natural land transformation	species.yr	3.79E-10	0	3.79E-10	4.13E-07	0	4.13E-07	0.000228041	0	0.000228041
Metal depletion	\$	0.001721991	0	0.001721991	7.03E-06	0	7.03E-06	0.000165143	0	0.000165143
Fossil depletion	\$	0.033694545	0	0.033694545	0.000137474	0	0.000137474	0.001405145	0	0.001405145

## Perbandingan Nilai Dampak Seluruh Proses (Karakterisasi)

Impact category	Unit	PS Extrusion	PS Cutting	PS Forming	Transport beads	Transport box	Extraction	Packaging
Climate change Human Health	DALY	0.00146936	0.000414402	0.001224467	7.28E-05	8.42E-06	0.001812309	8.53E-06
Ozone depletion	DALY	1.19E-07	6.44E-08	9.92E-08	2.54E-08	2.76E-09	8.17E-08	3.39E-10
Human toxicity	DALY	0.000623774	0.000338293	0.000519812	1.52E-05	1.04E-06	1.14E-05	4.35E-07
Photochemical oxidant formation	DALY	1.27E-07	3.95E-08	1.06E-07	1.60E-08	8.31E-10	1.68E-07	1.01E-09
Particulate matter formation	DALY	0.005656369	0.003018302	0.004713641	3.94E-05	2.47E-06	0.000310228	2.40E-06
Ionising radiation	DALY	2.74E-07	1.49E-07	2.28E-07	6.50E-08	7.28E-09	5.97E-09	5.89E-09
Climate change Ecosystems	species.yr	8.32E-06	2.35E-06	6.94E-06	4.12E-07	4.77E-08	1.03E-05	4.83E-08
Terrestrial acidification	species.yr	2.85E-08	1.08E-08	2.38E-08	1.59E-09	1.08E-10	2.19E-08	1.33E-10
Freshwater eutrophication	species.yr	6.70E-08	3.64E-08	5.58E-08	1.86E-10	2.88E-11	1.93E-09	3.44E-11
Terrestrial ecotoxicity	species.yr	6.42E-09	3.19E-09	5.35E-09	5.80E-09	2.52E-10	2.32E-09	3.60E-11
Freshwater ecotoxicity	species.yr	2.08E-08	1.12E-08	1.73E-08	3.34E-10	3.63E-11	9.54E-10	2.13E-11
Marine ecotoxicity	species.yr	4.03E-09	2.16E-09	3.36E-09	1.06E-10	8.54E-12	1.89E-10	4.04E-12
Agricultural land occupation	species.yr	4.58E-08	2.43E-08	3.82E-08	8.62E-09	1.09E-09	5.52E-09	6.13E-09
Urban land occupation	species.yr	3.12E-08	1.66E-08	2.60E-08	5.76E-08	4.23E-09	3.07E-09	7.13E-10
Natural land transformation	species.yr	2.24E-07	1.22E-07	1.86E-07	3.55E-08	3.83E-09	2.87E-11	5.27E-10
Metal depletion	\$	0.40571424	0.16121031	0.3380952	0.12960854	0.022713732	0.27765784	0.005213637
Fossil depletion	\$	46.357825	0.8006663	38.631521	3.116756	0.34652423	120.82446	0.63771508

## Perbandingan Nilai Dampak Seluruh Proses (Normalisasi)

Impact category	PS Extrusion	PS Cutting	PS Forming	Transport beads	Transport box	Extraction	Packaging
Climate change Human Health	0.10770409	0.03037566	0.089753412	0.005336162	0.000617383	0.13284226	0.000625114
Ozone depletion	8.73E-06	4.72E-06	7.27E-06	1.86E-06	2.02E-07	5.99E-06	2.49E-08
Human toxicity	0.045722667	0.024796895	0.038102223	0.001115291	7.60E-05	0.000837692	3.19E-05
Photochemical oxidant formation	9.31E-06	2.90E-06	7.76E-06	1.18E-06	6.09E-08	1.23E-05	7.41E-08
Particulate matter formation	0.41461186	0.2212415	0.34550988	0.002885803	0.000181237	0.022739693	0.000175657
Ionising radiation	2.01E-05	1.09E-05	1.67E-05	4.77E-06	5.34E-07	4.37E-07	4.31E-07
Climate change Ecosystems	0.009071637	0.002559043	0.007559697	0.000449452	5.20E-05	0.011186057	5.26E-05
Terrestrial acidification	3.11E-05	1.18E-05	2.59E-05	1.74E-06	1.18E-07	2.38E-05	1.45E-07
Freshwater eutrophication	7.30E-05	3.97E-05	6.08E-05	2.03E-07	3.14E-08	2.10E-06	3.75E-08
Terrestrial ecotoxicity	7.00E-06	3.47E-06	5.84E-06	6.32E-06	2.74E-07	2.53E-06	3.93E-08
Freshwater ecotoxicity	2.27E-05	1.22E-05	1.89E-05	3.65E-07	3.96E-08	1.04E-06	2.32E-08
Marine ecotoxicity	4.39E-06	2.36E-06	3.66E-06	1.16E-07	9.31E-09	2.06E-07	4.40E-09
Agricultural land occupation	4.99E-05	2.65E-05	4.16E-05	9.40E-06	1.19E-06	6.02E-06	6.68E-06
Urban land occupation	3.40E-05	1.81E-05	2.83E-05	6.27E-05	4.61E-06	3.35E-06	7.77E-07
Natural land transformation	0.000243703	0.000132989	0.000203086	3.86E-05	4.17E-06	3.13E-08	5.74E-07
Metal depletion	0.001655314	0.000657738	0.001379428	0.000528803	9.27E-05	0.001132844	2.13E-05
Fossil depletion	0.18913993	0.003266719	0.1576166	0.012716364	0.001413819	0.49296379	0.002601878



## Perbandingan Nilai Dampak Seluruh Proses (Pembobotan)

Impact category	Unit	PS Extrusion	PS Cutting	PS Forming	Transport beads	Transport box	Extraction	Packaging
Total	Pt	269.20472	112.48033	224.33726	6.6146503	0.6764435	165.88474	0.88228603
Climate change Human Health	Pt	43.081638	12.150264	35.901365	2.1344649	0.24695304	53.136903	0.25004559
Ozone depletion	Pt	0.003490686	0.001887011	0.002908905	0.00074456	8.08E-05	0.002394846	9.95E-06
Human toxicity	Pt	18.289067	9.9187582	15.240889	0.44611649	0.030401119	0.33507687	0.012765171
Photochemical oxidant formation	Pt	0.003724356	0.001159248	0.00310363	0.000470527	2.44E-05	0.004929075	2.96E-05
Particulate matter formation	Pt	165.84474	88.496601	138.20395	1.154321	0.072494684	9.0958771	0.07026279
Ionising radiation	Pt	0.008038889	0.004362245	0.006699074	0.001907192	0.000213558	0.000174999	0.00017257
Climate change Ecosystems	Pt	3.6286548	1.0236172	3.023879	0.17978084	0.020800038	4.4744228	0.021056967
Terrestrial acidification	Pt	0.012427399	0.004707519	0.010356166	0.000695037	4.72E-05	0.009527493	5.80E-05
Freshwater eutrophication	Pt	0.029193774	0.015860854	0.024328145	8.11E-05	1.26E-05	0.000840554	1.50E-05
Terrestrial ecotoxicity	Pt	0.002801066	0.001389681	0.002334222	0.002527079	0.00010967	0.001010118	1.57E-05
Freshwater ecotoxicity	Pt	0.009070169	0.00486601	0.007558474	0.000145814	1.58E-05	0.000415956	9.27E-06
Marine ecotoxicity	Pt	0.001756378	0.000942731	0.001463648	4.63E-05	3.72E-06	8.23E-05	1.76E-06
Agricultural land occupation	Pt	0.019975086	0.010597239	0.016645905	0.003759639	0.000474883	0.002407092	0.002673416
Urban land occupation	Pt	0.013607433	0.007225229	0.011339527	0.025099343	0.00184473	0.001338861	0.00031079
Natural land transformation	Pt	0.097481324	0.053195711	0.081234437	0.01545692	0.001669083	1.25E-05	0.000229568
Metal depletion	Pt	0.33106282	0.13154761	0.27588569	0.10576057	0.018534405	0.2265688	0.004254328
Fossil depletion	Pt	37.827985	0.6533437	31.523321	2.5432729	0.28276377	98.592757	0.5203755

## Perbandingan Nilai Dampak Skenario Penanganan Limbah

Impact category	Characterization				Normalization			Weighting (mPt)		
	Unit	Incineration	Recycle	Landfill	Incineration	Recycle	Landfill	Incineration	Recycle	Landfill
Climate change Human Health	DALY	1.28E-09	9.75E-07	3.94E-09	9.38E-08	7.15E-05	2.89E-07	0.037534748	28.588346	0.11541103
Ozone depletion	DALY	0	7.90E-11	1.32E-12	0	5.79E-09	9.70E-11	0	0.002316368	3.88E-05
Human toxicity	DALY	6.46E-08	4.14E-07	1.97E-07	4.73E-06	3.03E-05	1.45E-05	1.8927945	12.136358	5.7873764
Photochemical oxidant formation	DALY	3.91E-11	8.43E-11	4.17E-13	2.86E-09	6.18E-09	3.06E-11	0.001145346	0.002471428	1.22E-05
Particulate matter formation	DALY	0	3.75E-06	1.14E-09	0	0.00027513	8.36E-08	0	110.05215	0.033430909
Ionising radiation	DALY	0	1.82E-10	3.43E-12	0	1.33E-08	2.51E-10	0	0.005334489	0.000100527
Climate change Ecosystems	species.yr	7.25E-12	5.52E-09	2.23E-11	7.90E-09	6.02E-06	2.43E-08	0.003161558	2.4079223	0.009720693
Terrestrial acidification	species.yr	0	1.89E-11	5.14E-14	0	2.06E-08	5.60E-11	0	0.008246641	2.24E-05
Freshwater eutrophication	species.yr	0	4.44E-11	1.13E-14	0	4.84E-08	1.23E-11	0	0.019372563	4.92E-06
Terrestrial ecotoxicity	species.yr	3.79E-09	4.26E-12	2.80E-09	4.13E-06	4.65E-09	3.05E-06	1.6517052	0.001858746	1.2188697
Freshwater ecotoxicity	species.yr	3.56E-13	1.38E-11	1.55E-10	3.88E-10	1.50E-08	1.69E-07	0.00015501	0.006018832	0.067664734
Marine ecotoxicity	species.yr	3.43E-14	2.67E-12	5.41E-13	3.74E-11	2.91E-09	5.90E-10	1.50E-05	0.001165507	0.00023591
Agricultural land occupation	species.yr	0	3.04E-11	4.74E-13	0	3.31E-08	5.16E-10	0	0.013255175	0.000206581
Urban land occupation	species.yr	0	2.07E-11	2.54E-12	0	2.26E-08	2.77E-09	0	0.009029694	0.001109582
Natural land transformation	species.yr	0	1.48E-10	1.84E-12	0	1.62E-07	2.01E-09	0	0.064687184	0.000803539
Metal depletion	\$	0	0.000269226	8.38E-06	0	1.10E-06	3.42E-08	0	0.21968846	0.006837022
Fossil depletion	\$	0	0.030762376	0.000163948	0	0.00012551	6.69E-07	0	25.102099	0.13378138